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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,726	07/19/2006	Sergey Amontov	CH920020037US1	8613

877 7590 07/09/2007
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EXAMINER	
BERTAGNA, ANGELA MARIE	

ART UNIT	PAPER NUMBER
1637	

MAIL DATE	DELIVERY MODE
07/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/539,726	AMONTOV ET AL.
	Examiner	Art Unit
	Angela Bertagna	1637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _23 April 2007_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-23_ is/are pending in the application.

4a) Of the above claim(s) _23_ is/are withdrawn from consideration.

5)☐ Claim(s) ____ is/are allowed.

6)☒ Claim(s) _1-22_ is/are rejected.

7)☐ Claim(s) ____ is/are objected to.

8)☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _19 July 2006_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _10/20/06_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-22, in the reply filed on April 23, 2007 is acknowledged.

Claim 23 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on April 23, 2007.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 4, 6, 7, 9, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Hawker et al. (US 2002/0071943 A1; cited previously).

Regarding claim 1, Hawker teaches a method for producing a monolayer of molecules on a surface (see Example 1, paragraphs 80-83) comprising:

(a) loading a stamp with seed molecules (Example 1, paragraph 81)

(b) transferring seed molecules from the stamp to the surface (Example 1, paragraph 81)

(c) amplifying the seed molecules via an amplifying reaction to produce the monolayer (Example 1, paragraphs 80, 82, and 83).

Regarding claim 2, Hawker teaches that the transferring step (b) in claim 1 comprises transferring a fraction of the seed molecules loaded on the stamp to the surface (paragraph 81).

Regarding claim 4, Hawker teaches linear amplification (paragraph 83).

Regarding claims 6 and 7, Hawker teaches directional amplification of the seed molecules to form conductive structures (see paragraphs 13-18 and 61-62, where directional amplification is taught; the alkanethiol SAMs produced in Example 1 are conductive structures).

Regarding claim 9, Hawker teaches that the directional amplification is controlled by the geometry of the seed molecule (see paragraphs 13-18 and 61-62).

Regarding claim 20, Hawker teaches that the monolayer protects the surface from etchants (paragraphs 4 and 65).

5. Claims 1, 2, 5-7, 9-11, 14, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Maracas et al. (US 5,731,152).

Regarding claim 1, Maracas teaches a method for producing a monolayer of molecules on a surface, comprising:

(a) loading a stamp with seed molecules (see Figure 19, step 304 and column 7, lines 55-63)

(b) transferring the seed molecules from the stamp to the surface (see Figure 19, step 306 and column 7, line 64 – column 8, line 3)

(c) amplifying the seed molecules to produce the monolayer (column 4, lines 24-35).

Regarding claim 2, Maracas teaches that the transferring comprises transferring a fraction of the seed molecules loaded on the stamp to the surface (column 7, line 64 – column 8, line 3).

Regarding claims 5 and 14, Maracas teaches exponential amplification by PCR (column 4, lines 24-35).

Regarding claims 6, 7, and 9, the PCR amplification taught by Maracas (column 4, lines 24-35) is a directional amplification method that is controlled by the geometry of the nucleic acids that constitute the seed molecules. The resulting amplified nucleic acids are conductive structures.

Regarding claims 10 and 11, Maracas teaches control of the amplification reaction by an external force, specifically an electrical force (see column 4, lines 11-35, where resistive heaters control the thermal cycling process).

Regarding claim 21, Maracas teaches that the monolayer comprises DNA (see column 2, lines 61-67). Also, the amplification reaction taught by Maracas at column 4, lines 24-35) results in a monolayer comprising DNA.

6. Claims 1, 2, 4, 6, 7, 9, 17, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Fang et al. (US 7,105,347 B2) as evidenced by Maracas et al. (US 5,731,152).

Regarding claim 1, Fang teaches a method for producing a monolayer of molecules on a surface, comprising:

(a) loading a stamp with seed molecules (see column 13, lines 38-42, where Fang teaches forming arrays by microstamping as taught by Maracas (US 5,731,152); as noted above, the microstamping method taught by Maracas comprises loading a stamp with seed molecules – see column 7, lines 55-63 and Figure 19, step 304)

(b) transferring the seed molecules from the stamp to the surface (see column 13, lines 38-42, where Fang teaches forming arrays by microstamping as taught by Maracas (US 5,731,152); as noted above, the microstamping method taught by Maracas comprises transferring seed molecules from the stamp to the surface – see Figure 19, step 306 and column 7, line 64 – column 8, line 3)

(c) amplifying the seed molecules to produce the monolayer (see column 3, lines 17-25, where Fang teaches amplification of arrayed DNA templates by coupled transcription/translation reactions).

Regarding claim 2, Fang teaches that the transferring comprises transferring a fraction of the seed molecules loaded on the stamp to the surface (see column 13, lines 38-42, where Fang

teaches forming arraying by microstamping as taught by Maracas (US 5,731,152); as noted above, the microstamping method taught by Maracas comprises transferring a fraction of the seed molecules from the stamp to the surface – column 7, line 64 – column 8, line 3).

Regarding claim 4, the in vitro transcription/translation reactions taught by Fang (column 3, lines 17-25) are a linear amplification.

Regarding claims 6, 7, and 9, the in vitro transcription/translation reactions taught by Fang (column 3, lines 17-25) are a directional amplification method that is controlled by the geometry of the nucleic acids that constitute the seed molecules. The resulting amplified nucleic acids produced in the in vitro transcription step and the proteins produced by the in vitro translation step are conductive structures.

Regarding claim 17, Fang teaches that the amplifying comprises in vitro translation to produce a monolayer of protein (column 3, lines 17-25).

Regarding claim 21, Fang teaches that the monolayer comprises DNA (column 3, lines 17-25).

7. Claims 1, 2, 4, 6, 7, 9-11, 13, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Korlach et al. (US 2003/0044781 A1)..

Regarding claim 1, Korlach teaches a method for producing a monolayer of molecules on a surface, comprising:

(a) loading a stamp with seed molecules (see paragraph 39, where Korlach teaches stamping a surface with nucleic acid primers; microstamping inherently requires loading a stamp with seed molecules)

(b) transferring the seed molecules from the stamp to the surface (see paragraph 39, where Korlach teaches stamping a surface with nucleic acid primers; microstamping inherently transferring the seed molecules from the stamp to the surface)

(c) amplifying the seed molecules to produce the monolayer (see Figure 1 and paragraph 39, where Korlach teaches polymerase-mediated extension of the immobilized primer).

Regarding claim 2, Korlach teaches that the transferring comprises transferring a fraction of the seed molecules loaded on the stamp to the surface, because practice of the microstamping method taught in paragraph 39 inherently results in transfer of a fraction of the seed molecules to the surface.

Regarding claim 4, the primer extension reactions taught by Korlach (paragraph 39) are a linear amplification.

Regarding claims 6, 7, and 9, the primer extension reactions taught by Korlach (paragraph 39) are a directional amplification method that is controlled by the geometry of the nucleic acids that constitute the seed molecules. The resulting amplified nucleic acids produced by primer extension of the immobilized nucleic acids are conductive structures.

Regarding claims 10, 11, and 13, Korlach teaches that the directional amplification is controlled by application of an external force, specifically an electrical or hydrodynamic force (see paragraph 60, where the nucleotide substrates used in the amplification process are supplied by electrical or hydrodynamic forces).

Regarding claim 21, Korlach teaches that the monolayer comprises DNA (see Figure 1 and paragraph 39).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 3 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hawker et al. (US 2002/0071943 A1) in view of Kumar et al. (Applied Physics Letters (1993) 63(14): 2002-2004).

Hawker teaches the method of claims 1, 2, 4, 6, 7, 9, and 20, as discussed above.

Hawker does not teach that the adsorption of the seed molecules to the stamp is stronger than the adsorption of the seed molecules to the surface as required by claim 3. Hawker also does not teach repeating the transfer and amplification steps on plural surfaces before reloading the stamp with seed molecules as required by claim 22.

Kumar teaches methods of microstamping self-assembled monolayers on a gold substrate using an elastomer stamp (see abstract). Regarding claims 3 and 22, Kumar teaches using the same stamp to transfer seed molecules to a plurality of substrates without reloading between transfers (see Figures 4b and 4c). Since Kumar was able to transfer seed molecules to a surface multiple times without reloading the stamp, the adsorption of the seed molecules to the stamp is inherently stronger than their adsorption to the gold substrate.

It would have been prima facie obvious for one of ordinary skill in the art at the time of invention to apply the teachings of Kumar to the method taught by Hawker. An ordinary practitioner would have been motivated by the teachings of Kumar to conduct multiple transfer and amplification steps before reloading the stamp with seed molecules when practicing the method taught by Hawker, recognizing that the ability to perform multiple transfer steps without reloading would save both time and resources. Since the methods taught by Hawker and Kumar were both directed to the microstamping of alkanethiols on gold substrates (see paragraphs 80-83 of Hawker and Figure 2 of Kumar), an ordinary practitioner would have had a reasonable expectation of success in applying the teachings of Kumar to the method taught by Hawker. Therefore, the method of claims 3 and 22 is prima facie obvious in view of the combined teachings of Hakwer and Kumar.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hawker et al. (US 2002/0071943 A1) in view of Kumar et al. (US 5,512,131).

Hawker teaches the method of claims 1, 2, 4, 6, 7, 9, and 20, as discussed above.

Hawker does not teach electroless plating of the directionally amplified seed molecules with a metal.

Kumar teaches methods of fabricating microelectronics comprising formation of a self-assembled monolayer (SAM) by microstamping followed by electroless deposition of a metal (see column 2, line 39 – column 3, line 45 for a general description). Regarding claim 8, Kumar teaches electroless plating with a metal (see Example 4, column 19, lines 36-46). Kumar teaches that this method is useful for making microelectronic conductors (column 3, line 66 – column 4, line 23).

It would have been prima facie obvious for one of ordinary skill in the art at the time of invention further include an electroless metal plating step as taught by Kumar when practicing the method taught by Hawker. The method of Hawker was particularly directed to the manufacture of microcircuitry such as microelectronic resistors, capacitors, transistors, and circuit breakers (see paragraphs 32 and 73). Hawker further taught that the SAMs formed by the disclosed method were useful for controlling the location of deposition of metals in subsequent plating reactions used for fabrication of microelectronic devices (see paragraphs 65 and 73). Since Hawker expressly suggested subsequent plating of the SAM-containing surfaces for formation of microelectronic devices (paragraphs 32, 65, and 73), an ordinary practitioner would have been motivated to further include an electroless plating step as taught by Kumar in order to achieve the ultimate goal of the method – fabrication of microelectronic devices. An ordinary practitioner would have had a reasonable expectation of success in doing so, since the methods of Hawker and Kumar were both directed to the manufacture of microelectronic devices by

microstamping a SAM on a surface followed by etching or plating. Thus, the method of claim 8 is prima facie obvious in view of the combined teachings of Hawker and Kumar.

11. Claims 12, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maracas et al. (US 5,731,152) in view of Mian et al. (US 5,686,271).

Maracas teaches the method of claims 1, 2, 5-7, 9-11, 14, and 21, as discussed above.

Maracas does not teach that the amplification is controlled by an applied magnetic force as required by claim 12. Maracas also does not teach that one PCR primer is immobilized on the substrate while the other primer is supplied in solution, as required by claims 15 and 16.

Mian teaches a method for conducting PCR using magnetic fields termed a "magnetic cycle reaction" or MCR. The MCR method taught by Mian comprises assembling a PCR reaction mixture, conducting multiple cycles of denaturation, annealing, and extension using an electromagnetic field to effect strand separation (see Example 7, column 16, line 50 – column 18, line 9).

Regarding claim 12, the PCR amplification taught by Mian is controlled by application of a magnetic field (see Example 7, column 16, line 50 – column 18, line 9).

Regarding claims 15 and 16, Mian teaches that one primer is immobilized on a surface and the other primer is supplied in solution (see Example 7, column 16, lines 50-66, where one primer is immobilized on the bottom of a well of a microtiter plate and the other primer is added in solution)..

Mian teaches that magnetic control of PCR amplification has a number of advantages relative to conventional PCR, where high temperatures are used to denature double-stranded

DNA targets. Specifically, Mian teaches that the use of electromagnetism for strand separation eliminates the need to use a thermophilic polymerase in the PCR reaction and permits the use of mesophilic polymerases. Mian teaches that this is advantageous, because mesophilic polymerases have higher fidelity, faster extension rates, and greater processivity than their thermophilic counterparts, thus resulting in a faster, more accurate amplification process that is capable of amplifying longer targets (column 2, lines 19-45).

It would have been prima facie obvious for one of ordinary skill in the art at the time of invention to substitute the MCR reaction as taught by Mian for the conventional PCR amplification taught by Maracas. An ordinary practitioner would have been motivated to do so, since Mian taught that electromagnetic denaturation permitted the use of mesophilic polymerases with higher fidelity, faster extension rates and greater processivity than their thermophilic counterparts, thus resulting in a faster, more accurate amplification process capable of amplifying longer templates (column 2, lines 19-45). An ordinary practitioner would have had a reasonable expectation of success in applying the teachings of Mian to the method taught by Maracas, since Maracas taught temperature control of the amplification using electrical heating elements (column 4, lines 10-16), and Mian taught modification of electrical heating elements with magnetic material (column 2, line 45 – column 3, line 12). Thus, the methods of claims 12, 15, and 16 are prima facie obvious in view of the combined teachings of Maracas and Mian.

12. Claims 8, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hawker et al. (US 2002/0071943 A1) in view of Biebuyck et al. (WO 00/79023 A1).

Hawker teaches the method of claims 1, 2, 4, 6, 7, 9, and 20, as discussed above.

Hawker does not teach electroless plating of the directionally amplified seed molecules with a metal as required by claim 8. Hawker also does not teach that the seed molecules are bound to a catalyst center for electroless deposition as required by claims 18 and 19.

Biebuyck teaches stamping catalytic ink on a surface followed by elecrtroless deposition of metals (see abstract and page 3, line 25 – page 4, line 26). Regarding claims 8 and 19, Biebuyck teaches a method comprising coating a surface with a catalyst for electroless deposition, microstamping an alkanethiol SAM on a surface comprising a catalyst for electroless deposition to protect predetermined regions from etchants, treating the surface with etchants to remove the catalyst from unprotected regions, and conducting electroless deposition of metals (page 6, line 14 – page 7, line 25). Regarding claims 18 and 19, the method of Biebuyck comprises microstamping a substrate surface with ink containing a catalyst for electroless deposition and conducting electroless deposition of metals, thereby forming a pattern of metallic structures matching the printed catalytic pattern (see page 3, line 25 – page 4, line 26). Biebuyck teaches that the above methods allow the user to control electroless deposition of metals through selective patterning that is cheaper than conventional lithography methods (page 1, lines 20-26). Biebuyck further teaches that the microstamping method produces a patterned layer of catalyst molecules on the substrate "with a homogeneous thickness, high purity and high density (page 3, lines 20-23)."

It would have been prima facie obvious for one of ordinary skill in the art at the time of invention to apply the teachings of Biebuyck to the method taught by Hawker. The method of Hawker was particularly directed to the manufacture of microcircuitry such as microelectronic resistors, capacitors, transistors, and circuit breakers (see paragraphs 32 and 73). Hawker further

taught that the SAMs formed by the disclosed method were useful for controlling the location of deposition of metals in subsequent plating reactions used for fabrication of microelectronic devices (see paragraphs 65 and 73). Since Hawker expressly suggested subsequent plating of the SAM-containing surfaces for formation of microelectronic devices (paragraphs 32, 65, and 73), an ordinary practitioner would have been motivated to further include an electroless plating step as taught by Biebuyck in order to achieve the ultimate goal of the method – fabrication of microelectronic devices. An ordinary practitioner would also have been motivated by the teachings of Biebuyck to microstamp seed molecules comprising a catalyst center for electroless deposition on the surface when practicing the method taught by Hawker, since Biebuyck taught that this was a useful method of achieving selective electroless deposition of metals (see pages 3-4, cited above). An ordinary practitioner would have had a reasonable expectation of success in applying the teachings of Biebuyck to the method taught by Hawker, since both methods were directed to the manufacture of microelectronic devices by microstamping a SAM on a surface followed by etching or plating. Thus, the methods of claims 8, 18, and 19 are prima facie obvious in view of the combined teachings of Hawker and Biebuyck.

Double Patenting

13. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that, "whoever invents or discovers any new and useful process ... may obtain a patent therefor..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claims 1-22 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-22 of copending Application No. 11/154,965. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

Conclusion

No claims are currently allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela Bertagna whose telephone number is 571-272-8291. The examiner can normally be reached on M-F, 7:30 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571-272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Angela Bertagna
Art Unit 1637 AMB
July 3, 2007

amb

JEFFREY FREDMAN
PRIMARY EXAMINER
7/5/07